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EXAMINER	
LEE, DAVID J	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 11/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/990,964	CHRAPLYVY ET AL.	
	Examiner	Art Unit	
	David Lee	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-13,15 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-13,15 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments filed on 10/6/2005, with respect to the rejections of claims 1, 2, 9, and 16 under 102(e) have been fully considered. Examiner agrees with the Applicant that the NRZ data 105 entering the phase modulator 2 in Figure 14 of Ito (US Patent No. 6,650,846) is a typographical error. Instead, Ito intended that the phase modulator accept the bit rate frequency sine wave and that the intensity modulator accept the NRZ data. As such, Ito does not disclose "a modulator for modulating an optical phase of said pulses in accordance with an input digital data stream", and therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Mamyshev et al. and relevant references.

Applicant's request for reconsideration of the finality of the rejection of the last Office action, sent 8/10/2005, is persuasive and, therefore, the finality of that action is withdrawn.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1, 2, 4, 5, 7, 8, 9, and 16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of Liu et al. (copending Application No. 09/990,965) in view of Ito (US Patent No. 6,650,846).

Regarding claims 1, 2, and 16, Liu teaches an optical communication system comprising: a transmitter, including: a means for modulating an optical carrier in a sequence of RZ pulses; a modulator for modulating an optical phase of said pulses in accordance with an input digital data stream to form an optical phase modulated signal and a means for applying the optical phase modulated signal to an optical transmission link; and a receiver of the optical phase modulated signal (claims 7 and 8). Liu does not expressly disclose that the optical transmission link is a dispersion managed link/medium, however, dispersion managed links are well known in the art and widely used in long haul transmission systems. For example, Ito teaches an optical transmission system for improving transmission characteristics by suppressing non-linear effects, comprising a dispersion managed link for dispersion compensation (col. 4, lines 30-40). It would have been obvious to a skilled artisan at the time of invention to include dispersion

compensation, as indicated by Ito, along the optical transmission link of Liu in order to compensate for dispersion and thereby improving transmission quality.

Regarding claims 4 and 5, Liu teaches PSK modulation and DPSK modulation (claims 2 and 3).

Regarding claims 7 and 8, Liu teaches soliton transmission (claim 6) and that pulses disperse as they propagate along the medium (pulses will disperse in fiber).

Regarding claim 9, Liu teaches combining an output signal with other phase modulated signals of different wavelengths (claim 5).

4. Claim 6 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of Liu et al. (copending Application No. 09/990,965) in view of Ito (US Patent No. 6,650,846) and in further view of Griffin (US Pub. No. 2004/0081470 A1).

Regarding claim 6, the combined invention of Liu and Ito teaches the limitations of claim 2 but does not expressly disclose that the modulator is a QPSK modulator. However, QPSK modulation is a modulation scheme well known in the art of data encoding and is one of a plurality of modulation formats available to an artisan. For example, Griffin discloses a QPSK modulator (paragraph 0016). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a QPSK modulator as indicated by Griffin in the system of Liu and Ito because QPSK modulation has the advantages of high spectral efficiency and low bit error rate. Also, both the in-phase and the quadature portions of the carrier signal can be modulated and combined to form the QPSK signal.

5. Claims 10 and 15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of Liu et al. (copending Application No. 09/990,965) in view of Ito (US Patent No. 6,650,846) and in further view of Suzuki et al. (US Patent No. 6,005,702).

Regarding claim 10, the combined invention of Liu and Ito teaches the limitations of claim 2, but does not expressly disclose that the modulator is a LiNbO3 modulator. However, LiNbO3 modulators are well known in the art. For example, Suzuki teaches a LiNbO3 phase modulator (col. 3, lines 64-65). It would have been obvious to one of ordinary skill in the art at the time of invention to use a LiNbO3 modulator as indicated by Suzuki in the system of Liu and Ito in order to have an effective and reliable modulation scheme.

Regarding claim 15, the combined invention of Liu and Ito teaches the limitations of claim 1 but does not expressly disclose that the transmission medium includes EDFA or Raman amplification. However, EDFAs are well known in the art and widely used in long haul transmission systems. For example, Suzuki teaches an EDFA for signal amplification (col. 4, lines 31-35). It would have been obvious to one of ordinary skill in the art at the time of invention to use an EDFA for amplification as indicated by Suzuki in the transmission medium of Liu and Ito in order to achieve a healthy and accurate signal.

6. Claim 11 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of Liu et al. (copending

Application No. 09/990,965) in view of Ito (US Patent No. 6,650,846) and in further view of Fukuchi (5,745,613).

Regarding claim 11, the combined invention of Liu and Ito teaches the limitations of claim 2, but does not expressly disclose that the modulator is a LiNbO3 MZ phase modulator. However, LiNbO3 MZ phase modulators are well known in the art. For example, Fukuchi discloses a LiNbO3 Mach-Zehnder phase modulator (col. 6, lines 31-34). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the LiNbO3 Mach-Zehnder modulator as indicated by Fukuchi in the system of Liu and Ito because Mach-Zehnder modulators have the advantage that the chirp may be adjusted to the bit rate and the transmission distance (col. 6, lines 34-36).

7. Claims 12 and 13 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of Liu et al. (copending Application No. 09/990,965) in view of Ito (US Patent No. 6,650,846) and in further view of Smith (US Patent No. 4,847,477).

Regarding claims 12 and 13, the combined invention Liu and Ito teaches the limitations of claim 1 but does not expressly disclose that the receiver includes a delay demodulator or a balanced receiver for recovering said input data from said phase modulated signal. Smith teaches a delay demodulator (fig. 3 – 18, and col. 4, line 21) and a balanced receiver for recovering said input data from said phase modulated signal (fig. 3 – 15, 25, and 22). One of ordinary skill in the art would have motivated to include these components of Smith in the receiver of Ito because balanced receivers eliminate relative intensity noise, canceling the

intensity components of a laser, and delay demodulators delay signals so as to provide evaluation and combination of the output signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to include a balanced receiver and/or a delay modulator as indicated by Smith in the receiver of Liu and Ito.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 1, 2, 7, 8, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mamyshev et al. (US Patent No. 6,072,615) in view of Ito (US Patent No. 6,650,846).

Regarding claims 1, 2, and 16, Mamyshev teaches an optical communication system comprising: a transmitter (fig. 1), including: a means for modulating an optical carrier in a sequence of RZ pulses (10 of fig. 1); a modulator for modulating an optical phase of said pulses in accordance with an input digital data stream to form an optical phase modulated signal (14 of fig. 1); and a means for applying the optical phase modulated signal to an optical transmission link (32 of fig. 1); and a receiver of the optical phase modulated signal (col. 8, lines 18-20). Mamyshev does not expressly disclose that the optical transmission link is a dispersion managed link/medium, however, dispersion managed links are well known in the art and widely used in long haul transmission systems. For example, Ito teaches an optical transmission system for

improving transmission characteristics by suppressing non-linear effects, comprising a dispersion managed link for dispersion compensation (col. 4, lines 30-40). It would have been obvious to a skilled artisan at the time of invention to include dispersion compensation, as indicated by Ito, along the optical transmission link of Mamyshev in order to compensate for dispersion and thereby improving transmission quality.

Regarding claim 7, Mamyshev teaches that the medium is a long haul transmission medium adapted for transmitting solitons (see Abstract).

Regarding claim 8, Mamyshev teaches that the medium is adapted for transmitting pulses that disperse as they propagate along the medium (pulses propagating through fiber will disperse).

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mamyshev in view of Ito and in further view of Ono et al. (US Patent No. 6,097,525).

Regarding claim 4, the combined invention of Mamyshev and Ito teaches the limitations of claim 2 but does not expressly disclose that the modulator is a PSK modulator. However, PSK modulation schemes are well known in the art, as is disclosed and illustrated by Ono (col. 8, lines 2-8; fig. 12) and are one of a plurality of modulation formats available to an artisan. A skilled artisan would have been motivated to use a PSK modulator in order to take advantage of the superiority in noise-proof capabilities characterized in PSK schemes. Therefore it would have been obvious to a skilled artisan at the time of invention to use the PSK modulation technique of Ono in the system of Mamyshev and Sharma in order to allow transmission of healthier signals.

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mamyshev in view of Ito and in further view of Miyamoto et al. (US Pub. No. 2003/0002121).

Regarding claim 5, the combined invention of Mamyshev and Ito teaches the limitations of claim 2 but does not expressly disclose that the modulator is a DPSK modulator. However, this type of modulation is well known in the art and is one of a plurality of modulation formats available to an artisan. For example, Miyamoto, from a similar field of endeavor, discloses an optical transmission system wherein the binary optical pulses are phase modulated using a DPSK format (Abstract; fig. 1). A skilled artisan would have been motivated to use the DPSK modulation scheme of Miyamoto in order to asynchronously detect the modulated data transmitted from a transmitter during the data demodulation and to easily resolve phase ambiguities at a receiver, thereby simplifying the demodulation process. Therefore it would have been obvious to a skilled artisan at the time of invention to utilize DPSK modulation as indicated by Miyamoto in the system of Mamyshev and Ito in order to have a simpler and cost-efficient receiver.

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mamyshev in view of Ito and in further view of Tzukerman et al. (US Patent No. 6,724,829).

Regarding claim 6, the combined invention of Mamyshev and Ito teaches the limitations of claim 2 but does not expressly disclose that the modulator is a QPSK modulator. However, QPSK modulation is a modulation scheme well known in the art of data encoding and is one of a plurality of modulation formats available to an artisan. For example, Tzukerman discloses a

QPSK modulator (314 of fig. 3, and col. 4, lines 56-57). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a QPSK modulator as indicated by Tzukerman in the system of Mamyshev and Ito because QPSK modulation has the advantages of high spectral efficiency and low bit error rate (col. 4, lines 56-61). Also, both the in-phase and the quadature portions of the carrier signal can be modulated and combined to form the QPSK signal.

13. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mamyshev in view of Ito and in further view of Griffin (US Pub. No. 2004/0081470 A1).

Regarding claim 6, the combined invention of Mamyshev and Ito teaches the limitations of claim 2 but does not expressly disclose that the modulator is a QPSK modulator. However, QPSK modulation is a modulation scheme well known in the art of data encoding and is one of a plurality of modulation formats available to an artisan. For example, Griffin discloses a QPSK modulator (paragraph 0016). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a QPSK modulator as indicated by Griffin in the system of Mamyshev and Ito because QPSK modulation has the advantages of high spectral efficiency and low bit error rate. Also, both the in-phase and the quadature portions of the carrier signal can be modulated and combined to form the QPSK signal.

14. Claims 10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mamyshev in view of Ito and in further view of Suzuki et al. (US Patent No. 6,005,702).

Regarding claim 10, the combined invention of Mamyshev and Ito teaches the limitations of claim 2, but does not expressly disclose that the modulator is a LiNbO3 modulator. However, LiNbO3 modulators are well known in the art. For example, Suzuki teaches a LiNbO3 phase modulator (col. 3, lines 64-65). It would have been obvious to one of ordinary skill in the art at the time of invention to use a LiNbO3 modulator as indicated by Suzuki in the system of Mamyshev and Ito in order to have an effective and reliable modulation scheme.

Regarding claim 15, the combined invention of Mamyshev and Ito teaches the limitations of claim 1 but does not expressly disclose that the transmission medium includes EDFA or Raman amplification. However, EDFAs are well known in the art and widely used in long haul transmission systems. For example, Suzuki teaches an EDFA for signal amplification (col. 4, lines 31-35). It would have been obvious to one of ordinary skill in the art at the time of invention to use an EDFA for amplification as indicated by Suzuki in the transmission medium of Mamyshev and Ito in order to achieve a healthy and accurate signal.

15. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mamyshev in view of Ito and in further view of Fukuchi (5,745,613).

Regarding claim 9, the combined invention of Mamyshev and Ito teaches the limitations of claim 1 but does not expressly disclose that the transmitter further includes a WDM to combine an output signal of the modulator with other phase modulated signals having optical carriers with different wavelengths. However this structure is well known in the art. For example, Fukuchi teaches a WDM to combine an output signal of the modulator with other modulated signals having optical carriers with different wavelengths (see fig. 1). It would have

been obvious to a skilled artisan at the time of invention to multiplex several modulated signals together as indicated by Fukuchi in order to efficiently utilize the bandwidth in the transmission in the system of Mamyshev and Ito.

Regarding claim 11, the combined invention of Mamyshev and Ito teaches the limitations of claim 2, but does not expressly disclose that the modulator is a LiNbO3 MZ phase modulator. However, LiNbO3 MZ phase modulators are well known in the art. For example, Fukuchi discloses a LiNbO3 Mach-Zehnder phase modulator (col. 6, lines 31-34). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the LiNbO3 Mach-Zehnder modulator as indicated by Fukuchi in the system of Mamyshev and Ito because Mach-Zehnder modulators have the advantage that the chirp may be adjusted to the bit rate and the transmission distance (col. 6, lines 34-36).

16. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mamyshev in view of Ito and in further view of Smith (US Patent No. 4,847,477).

Regarding claims 12 and 13, the combined invention Mamyshev and Ito teaches the limitations of claim 1 but does not expressly disclose that the receiver includes a delay demodulator or a balanced receiver for recovering said input data from said phase modulated signal. Smith teaches a delay demodulator (fig. 3 – 18, and col. 4, line 21) and a balanced receiver for recovering said input data from said phase modulated signal (fig. 3 – 15, 25, and 22). One of ordinary skill in the art would have motivated to include these components of Smith in the receiver of Ito because balanced receivers eliminate relative intensity noise, canceling the intensity components of a laser, and delay demodulators delay signals so as to provide evaluation

and combination of the output signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to include a balanced receiver and/or a delay modulator as indicated by Smith in the receiver of Mamyshev and Ito.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday, 9:00 am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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